

Response filed November 3, 2010

Reply to OA dated August 4, 2010

REMARKS

Claims 1 and 7-16 are currently pending in the subject application. Claims 10-16 have been withdrawn from consideration. The Applicants respectfully submit that no new matter has been added. It is believed that this paper is fully responsive to the Office Action dated August 4, 2010.

Claims 1 and 7-9 are rejected under 35 U.S.C. §103(a) as being unpatentable over Ikuine et al. (JP 2000-166489 and translation), hereinafter Ikuine in view of the combination of Industrial gums by Whistler et al. (page 205), hereinafter Whistler and Walter et al. (US 5,476,678), [hereinafter Walter].

Applicants respectfully traverse this rejection, for the following reasons.

There are substantial, important differences between the art relied upon by the Examiner and the combinations of features as set forth in the claims.

Enclosed is a Declaration under 37 C.F.R. §1.132.

The combination of features disclosed in the subject application is, as recited in Claim 1, directed to a method for producing modified gum arabic, comprising the step of heating gum

arabic having a loss-on-drying of not more than 3%, wherein gum arabic to be heat treated is in the form of powder having an average particle diameter of not more than 1.5 mm; the gum arabic is heated at a temperature of 90°C to 180°C and at reduced pressure. By using, as the gum arabic to be heated, gum arabic that is in the form of powder having an average particle diameter of not more than 1.5 mm and that has a loss-on-drying of not more than 3% by weight, and heating it at a temperature of 90°C to 180°C at reduced pressure, a modified gum arabic with excellent emulsifying ability can be obtained while preventing discoloration and agglomeration (caking) of the gum arabic.

Applicants have excerpted Tables 1 to 7 from the present specification, and classified the samples therein into those of the Examples and those of the Comparative Examples (see Appendix 1) so that the Examiner may better understand the above-mentioned effects of the combinations of features set forth in the present application. In each table, the samples of the Examples are highlighted in blue; the samples of the Comparative Examples are highlighted in pink; and the samples before heating (unmodified samples) are highlighted in yellow.

Hereunder, explanations regarding the tables (Appendix 1) are provided in order from Table 1.

(1) Table 1: Page 22 of the present specification

Table 1 shows examination results of the gum arabic samples modified under Processing condition 1 of Experimental Example 1 (Samples 1-1, 1-2, 1-3, 1-4 and 1-5). Specifically, gum arabic powder samples having an average particle diameter of 64 μm were heated at a

temperature of 125°C at reduced pressure. The loss-on-drying of each of the gum arabic powder samples was at first 11.3% by weight, and became 0% by weight after the completion of the heating. That is, the heating was performed when the loss-on-drying of each of the gum Arabic powder samples was not more than 3% by weight. It is confirmed that by performing the heating treatment under the above-mentioned conditions, a modified gum arabic having excellent emulsifying ability, i.e., having the Emulsifying ability Median of not more than 1 μm , preferably not more than 0.8 μm , can be obtained with no change in appearance, such as caking. The relationship between the Emulsifying ability Median and the emulsifying ability of gum arabic is described on page 13, lines 5 to 12 of the present specification.

(2) Table 2: Page 23 of the present specification

Table 2 shows examination results of the gum arabic samples modified under Processing condition 2 of Experimental Example 1 (Samples 2-1, 2-2, 2-3, 2-4 and 2-5). Specifically, gum arabic powder samples having an average particle diameter of 64 μm were heated at a temperature of 125°C at normal pressure. The loss-on-drying of each of the gum arabic powder samples was 5.5% by weight even after the completion of the heating. That is, the heating was performed when the loss-on-drying of each of the gum arabic powder samples was more than 3% by weight. Although a modified gum arabic having excellent emulsifying ability, i.e., having the Emulsifying ability Median of not more than 1 μm , can be obtained by performing the heating treatment under the above-mentioned conditions, changes in appearance, such as browning and caking, occur. This indicates that when gum arabic having a loss-on drying of not less than 5.5% by weight is heated at normal pressure, the resulting modified gum arabic will be browned and caked.

(3) Table 3: Page 24 of the present specification

Table 3 shows examination results of the gum arabic samples modified under Processing condition 3 of Experimental Example 1 (Samples 3-1, 3-2, 3-3, 3-4 and 3-5). Specifically, gum arabic powder samples, each having an average particle diameter of 64 μm , were heated at a temperature of 90° C at reduced pressure for 30 minutes so that the loss-on-drying of each of the samples became 3.6% by weight. Then, the pressure was returned to normal, and the thus-obtained samples were heated at a temperature of 125°C at normal pressure. As shown in Table 3 (the 3rd row from the top), even when heating is performed at a temperature of 90°C at reduced pressure, if the loss-on-drying is more than 3% by weight, caking will occur. It is also confirmed that even when the loss-on-drying of gum arabic is not more than 3% by weight, if the heating is performed at normal pressure, the resulting modified gum arabic undergoes changes in appearance, i.e., browning and caking, despite having excellent emulsifying ability, i.e., the Emulsifying ability Median of not more than 1 μm . The results of Tables 1 and 3 indicate that even when gum arabic is heated at reduced pressure, if the loss-on-drying of the gum arabic was more than 3% by weight, browning and caking will occur.

(4) Table 4: Page 28 of the present specification (Table I in the Declaration)

Table 4 shows examination results of the gum arabic samples modified under the processing conditions of Experimental Example 2 (Samples 1) to 4)). Although this experiment was conducted at reduced pressure (about 0.03 atm), the present specification fails to explicitly state this. Applicants are filing the above-mentioned "Experimental Example 2" as a Declaration

under 37 C.F.R. §1.132 (Appendix 2). Specifically, Table 4 of the specification is the same table as Table I of the Declaration.

Here, gum arabic powder samples having different average particle diameters (Samples 1): average particle diameter of 30 mm; Samples 2): average particle diameter of 6 mm; Samples 3): average particle diameter of 1.5 mm; Samples 4): average particle diameter of 0.083 mm) were heated at a temperature of 125°C at reduced pressure. Note that the losses-on-drying of the gum arabic powder samples (the samples corresponding to Samples 3 and 4 of the Examples of the present specification) were both at first 14.5% by weight, and became not more than 2.5% by weight after the completion of the heating. That is, the heating was performed when the losses-on-drying of the gum arabic powder samples were not more than 3% by weight.

Fig. 5 (Fig. A in the Declaration) shows the relationship between the particle diameter (mm) of the gum arabic to be heated and the discoloration degree upon heating. Fig. 6 (Fig. B in the Declaration) shows the relationship between the particle diameter (mm) of gum arabic to be heated and the degree of emulsifying ability increased by heating. From these figures, it can be understood that the heating of gum Arabic having a particle diameter of not more than 1.5 mm at reduced pressure can produce a modified gum arabic having a significantly lower discoloration degree and a significantly higher emulsifying ability while preventing caking, compared to the case where gum arabic having a particle diameter of not less than 6 mm is heated under the same conditions. This indicates that the particle diameter of gum arabic to be heated at reduced pressure is preferably not more than 1.5 mm, in order to increase emulsifying ability and to suppress discoloration.

(5) Tables 5 and 6: Pages 30 and 32 of the present specification

Tables 5 and 6 show examination results of the gum Arabic samples modified under the processing conditions of Experimental Example 3 (Samples (3)-1, (3)-2, (3)-3, (3)-4 and (3)-5), and Experimental Example 4 (Samples (4)-1, (4)-2, (4)-3, (4)-4, (4)-5 and (4)-6). Specifically, gum arabic powder samples having an average particle diameter of 83 μm or 64 μm were heated at 125°C at reduced pressure. The losses-on-drying of the gum arabic powder samples were at first 13.9% by weight or 11.3% by weight, and both became 0% by weight after the completion of the heating. That is, the heating was performed when the loss-on-drying of each of the gum arabic powder samples was not more than 3% by weight. It can be confirmed that a modified gum arabic having excellent emulsifying ability, i.e., having the Emulsifying ability Median of not more than 1 μm , can be obtained by performing the heating treatment under the above-mentioned conditions.

(6) Table 7: Page 34 of the present specification

Table 7 shows examination results of the gum arabic samples modified under the processing conditions of Experimental Example 5 (Samples 1), 2), 3), 4), 5), and 6)). Specifically, gum arabic powder samples having an average particle diameter of 64 μm were at first heated at 90°C at reduced pressure for 60 minutes so that the loss-on-drying of each of the gum arabic powder samples became 0% by weight. Thereafter, the resulting gum arabic powder samples were heated again at a temperature of 70°C to 200°C at reduced pressure. The results show that the heating of, at a temperature of 90°C to 180°C at reduced pressure, gum arabic powder that has a loss-on-drying of 0% by weight can produce a modified gum arabic having

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excellent emulsifying ability, i.e., the Emulsifying ability Median of not more than 1 μm ; however, when heating is performed at a temperature out of the temperature range set forth in the present application, i.e., 70°C or 200°C, the emulsifying ability will be reduced. This indicates that the heating at reduced pressure is preferably performed within the range as set forth in the present application, i. e., from 90°C to 180°C, from the viewpoint of increasing emulsifying ability.

As is clear from the above, it is important that the loss-on-drying of the gum arabic to be heated at reduced pressure is not more than 3% by weight, in order to prevent browning and caking (Tables 2 and 3); it is important that the particle diameter of the gum arabic to be heated at reduced pressure is not more than 1.5 mm, in order to improve emulsifying ability and suppress discoloration (Table 4 or Table I); and it is important that the temperature when heated at reduced pressure is in the range of from 90°C to 180°C (Table 7).

The disclosure of **Ikuine** and the features set forth in the subject application may share the common object of improving the emulsifying ability of gum arabic while preventing discoloration. However, **Ikuine** is silent about the object of suppressing caking. Further, **Ikuine** fails to specifically disclose that gum arabic that is in the form of powder having a particle diameter of not more than 1.5 mm and that has a loss-on-drying of not more than 3% by weight is heated at reduced pressure.

Even if the above-mentioned gum arabic that is in the form of powder can be assumed to have a particle diameter of not more than 1.5 mm from the disclosures of **Whistler et al.** etc., the

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following would not have been obvious for a skilled artisan from the cited references: when the gum arabic that is in the form of powder having a particle diameter of not more than 1.5 mm and that has "a loss-on-drying of not more than 3%" is heated "at reduced pressure" "at 90°C to 180°C", the emulsifying ability of the gum arabic can be improved without causing caking as well as discoloration.

Ikuine, Whistler, and Walter, alone or in combination, fail to describe, teach, or suggest the combination of features as set forth in claim 1 including at least the following features: "heating dried gum arabic having a loss-on-drying of not more than 3%, wherein gum arabic to be heat treated has an average particle diameter of not more than 1.5 mm; the gum arabic is heated at a temperature of 90°C to 180°C and at a reduced pressure."

The U.S. Patent and Trademark Office has the burden of proof to show that an applicant is not entitled to a patent if the claimed subject matter is anticipated by, or is obvious from, the art of record. A patent applicant is entitled to a patent unless the U.S. Patent and Trademark Office establishes otherwise.

Accordingly, in view of the above, Applicants respectfully submit that this rejection of claim 1 should be withdrawn. Claims 7-9 depend from claim 1. It is submitted that this rejection of claims 7-9 should be withdrawn by virtue of their dependency.

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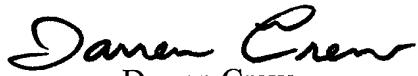
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If, for any reason, it is felt that this application is not now in condition for allowance, the Examiner is requested to contact the Applicants' undersigned attorney at the telephone number indicated below to arrange for an interview to expedite the disposition of this case.

In the event that this paper is not timely filed, the Applicants respectfully petition for an appropriate extension of time. Please charge any fees for such an extension of time and any other fees which may be due with respect to this paper, to Deposit Account No. 01-2340.

Respectfully submitted,

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Enclosure: Declaration under 37 C.F.R. §1.132